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Hua Xie

Biography Hua Xie joined JPL in 2004 as a member of technical staff. During the past seven years, she has worked on data compression/transmission and system analysis for the Deep Space Network communication system. Dr. Xie's work in data compression has been focused on high-fidelity Hyperspectral data compression, Region-of-Interest image compression, and distributed data compression for sensor networks. She co-developed ICER-3D, a wavelet based Hyperspectral image compressor, and played a key role in improving its performance by incorporating inter-band correlation into the context modeling. She led the development of classification map compressor and a near-lossless compressor for Hyperspectral imagery. Her most recent work has been on development of data compression algorithms for efficient communication in sensor networks, research and technology development for compressed sensing in astronomy and compressed radar imaging. Besides data compression, Dr. Xie also worked on various projects for telecommunication system analysis. She is leading a project that involves upgrade of the CCSDS telecommunication link analysis & modeling tool to support early planning for future space missions.

Education

- Ph.D., Electrical Engineering, University of Southern California
- M.S., Electrical Engineering, University of Southern California
- B.S., Physics and Electrical Engineering, Peking University

Research Interests

- Hyperspectral Data Compression

- Image Classification and Region-of-Interest Image Compression
 - Distributed Data compression in Sensor Networks
 - Compressed Sensing
 - Telecommunication system analysis and modeling
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Projects

- Compressed Radar Imaging
 - SCAN PSE telecommunication tool development
 - Content-driven Hyperspectral Data Compression
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Professional Experience

- Jet Propulsion Laboratory, Member of Technical Staff, Apr. 2004 - now
 - University of Southern California, Research Assistant, Jan. 1999 - May 2004
 - Hughes Research Laboratory, Research Intern, May, 2002 -- Aug. 2002
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Selected Awards

- NASA Tech Brief Award, A. Kiely, M. Klimesh, H. Xie, N. Aranki, "ICER-3D Hyperspectral Data Compression Software", Dec 2006
 - NASA software award, H. Xie and M. Klimesh, NTR-45103 "Lossless Compression of Classification Map Images", Oct 2007.
 - SCan Modeling and Simulation Team Award (JPL), July 2011
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Selected Publications

1. H. Xie, M. Klimesh, "Lossless Compression of Classification Maps for Region-of-Interest Image Compression", JPL IPN Progress Report, May. 2007.
 2. G. Shen et al, "A Distributed Wavelet Approach for Efficient Information Representation and Data gathering in Sensor Webs", NASA ESTC conference, June. 2008, Maryland.
 3. A. Kiely, H. Xie, M. Klimesh, and N. Aranki, "Context Modeler for Wavelet Compression of Spectral Hyperspectral Images", New Technology Report NPO-43239
 4. Hua Xie, Matthew Klimesh, "Low-Complexity Lossless and Near-Lossless Data Compression Technique for Multispectral Imagery," New Technology Report NTR-46625, Oct. 1, 2008.
 5. H. Xie, V. Andreu, and A. Ortega, "Quantization-based Feature Modeling for Kernel Design in Content-based Image Retrieval", 7th ACM SIGMM International Workshop on Multimedia Information Retrieval, October 26-27, 2006, Santa Barbara, CA USA (in conjunction with ACM Multimedia 2006).
 6. A. Kiely, M. Klimesh, H. Xie, N. Aranki, "ICER-3D: A Progressive Wavelet-based Compressor for Hyperspectral Images," JPL IPN Progress Report, vol. 42-164, February 15,
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2006.

7. M. Klimesh, A. Kiely, H. Xie, N. Aranki, "Spectral Ringing Artifacts in Hyperspectral Image Data Compression," JPL IPN Progress Report, vol. 42-160, pp. 1-17, February 15, 2005.